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Giardia in Pets

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What Are *Giardia*?

Electron micrograph of a *Giardia* trophozoite. Photo by CDC

Giardia are single-celled organisms, infectious to many types of animals (including humans) all over the world. As you can see in the above image, *Giardia* organisms have little whip-like tentacles called flagella that classify them as flagellates. They use their flagella to move around from place to place but when they find a spot where they wish to stay (like a cozy nook in the host's intestine), they use a suction cup-like structure (visible in the image) to attach. Their presence in the host intestine can cause diarrhea, though some hosts are symptom-free carriers. Different types of *Giardia* infect different types of animals; it is rare for *Giardia* from a pet to transmit to a human; further, dog and cat *Giardia* species are separate and cannot cross from dog to cat.

Giardia have two forms: the trophozoite and the cyst. The trophozoite (or "troph" for short) is the form that lives within the host, swimming around and attaching with its suction cup. The cyst, however, is the form that lives out in the environment. Trophs are passed in feces into the cold cruel world and must round up into cysts and form a shell if they are to withstand the temperature/moisture variability of the outside world. Cysts are the contagious stage. Trophs are the parasitic stage

Life as a *Giardia* Organism

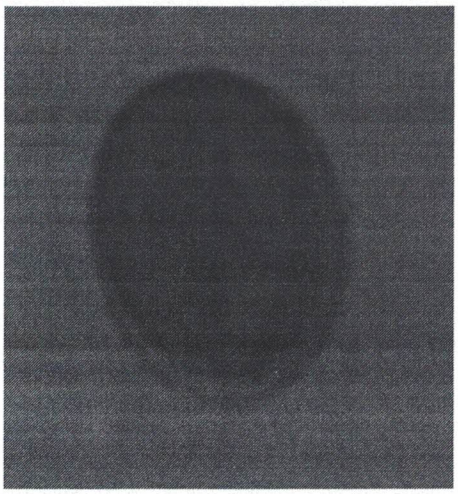
As mentioned, trophozoites are passed in fresh feces but promptly round up into hard-shelled little cysts so as to withstand the conditions of the outside world. The cysts live in the environment (outside the host's body) potentially for months until they are consumed by a host. Inside the host, the cyst's shell is digested away, releasing two trophozoites into the intestine and the cycle begins again. Contaminated water is the classical source of a *Giardia* infection.

When a fecal sample is analyzed, the appearance of the *Giardia* organism depends on whether the sample is freshly obtained or if it has been outside of the host's

body for a while. *Giardia* organisms begin to round up into cysts in a matter of hours. The active trophozoites rather look like funny faces with the two nuclei forming the eyes and median bodies forming the mouth. Cysts look a bit more generic.

When stained, the *Giardia* organism appears to have a funny face. Photo by Dr. RNDr. Josef Reischig, CSc. via Wikipedia Commons

In the environment, cysts survive in water and soil as long as it is relatively cool and wet. A host animal will accidentally swallow a cyst when drinking from a puddle, toilet, or when licking fur. After the cyst has been swallowed, the cyst's shell is digested away, freeing the two trophozoites who go forth and attach on the intestinal lining. The troph has a structure called a ventral disc, which is sort of like a suction cup and is used to attach the organism's body to the intestine. If the troph wants to move to another spot, it lifts itself up and swims to a new spot via its flagella. Trophs tend to live in different intestinal areas in different host species, but will move to other areas depending on the diet the host is eating. The troph may round itself up and form a cyst while still inside the host's body. If the host has diarrhea, both trophs and cysts may be shed in the diarrhea; either form can be found in fresh stool.



The *Giardia* cyst is basically a round egg-like structure. Photo by Joel Miller via Wikipedia Commons.

After infection, it takes 5 to 12 days in dogs or 5 to 16 days in cats for *Giardia* to be found in the host's stool. Diarrhea can precede the shedding of the *Giardia*. Infection is more common in kennel situations where animals are housed in groups.

How Does *Giardia* Cause Diarrhea?

No one is completely sure, but infection seems to cause problems with normal intestinal absorption of vitamins and other nutrients. Diarrhea is generally not bloody. Immune-suppressive medications, such as corticosteroids, can re-activate an old *Giardia* infection. We do not know why some infected hosts get diarrhea while others never do.

Diagnosis

In the past, diagnosis was difficult. The stool sample being examined needed to be fresh, plus *Giardia* rarely show up on the usual fecal testing methods used to detect other parasites. Several tricks have been developed to make *Giardia* easier to find (special stains, using special processing solutions etc.) but what has made the biggest difference in the diagnosis of *Giardia* is the ELISA test kit, which is similar in format to a home pregnancy test. This method has dramatically improved the ability to detect *Giardia* infections and the test can be completed in just a few minutes while you wait.

Giardia shed organisms intermittently and may be difficult to detect. Sometimes pets must be retested in order to find an infection and asymptomatic carrier animals are common.

Treatment

A broad spectrum dewormer called fenbendazole (Panacur®) seems to be the most reliable treatment at this time. Metronidazole (Flagyl®) in relatively high doses has been a classical treatment for *Giardia* but studies show it to only be effective in 67% of cases. For some resistant cases, both medications are used concurrently. Febantel is also commonly used for *Giardia* as it is converted to fenbendazole in the body.

Because cysts can stick to the fur of the infected patient and be a source for re-infection, the positive animal should receive a bath at least once in the course of treatment. At the least, the patient should have a bath at the end of the treatment course.

Can Humans be Infected?

The short answer is only rarely, so concern is pretty low in general.

That said, here is a more detailed answer: *Giardia duodenalis* is a classified into several subcategories called assemblages and designated A through G. Some assemblages are specific as to which host animals it can infect and other assemblages are not so picky. Assemblage F, for example, only infects cats and assemblages C and D only infect dogs but assemblage A will infect dogs, cats, people, rodents, wild mammals and cattle. Common testing methods do not indicate what assemblage has been detected so there is always a possibility of human transmission as long as the assemblage is unknown. To play it safe, wear gloves to dispose of animal fecal matter and always thoroughly wash hands before eating.

Environmental Decontamination

Giardia cysts are killed in the environment by freezing temperatures and by direct sunlight. If neither of these are practical for the area to be disinfected, a chemical disinfectant will be needed. The most readily available effective disinfectant is probably bleach diluted 1:10 in water; one study indicates that it requires less than one minute of contact to kill *Giardia* cysts. Organic matter such as dirt or stool is protective to the cyst, so on a concrete surface basic cleaning should be effected prior to disinfection. Quaternary ammonia compounds can also be used to kill *Giardia* cysts.

Animals should be thoroughly bathed before being reintroduced into a clean area. A properly chlorinated swimming pool should not be able to become contaminated. As for areas with lawn or plants, decontamination will not be possible without killing the plants and allowing the area to dry out in direct sunlight.

A Footnote on Vaccination

A vaccine against *Giardia* was previously available not to prevent infection in the vaccinated animal but to reduce the shedding of cysts by the vaccinated patient. In other words, the vaccine was designed to reduce the contamination of a kennel where *Giardia* was expected to be a problem. This would be helpful during an outbreak,in a shelter or rescue situation, but is not particularly helpful to the average dog whose owner wants to simply prevent infection. Because of limited usefulness of the vaccine, manufacturing was discontinued in 2009.

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